

must be limited to reserve 50% of the required starting capability.

(d) *Transfer of control location.* Transfer of control location must meet section 4–9–2/5.11 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1). Manual alternative-propulsion-control locations must be capable of overriding, and of operating independent of, all remote and automatic propulsion-control locations.

(e) *Control system details.* (1) Each operator control device must have a detent at the zero thrust position.

(2) Propulsion machinery automatic safety trip control operation must only occur when continued operation could result in serious damage, complete breakdown, or explosion of the equipment. Other than the overrides mentioned in § 62.25–10(a)(4) and temporary overrides located at the main navigating bridge control location, overrides of these safety trip controls are prohibited. Operation of permitted overrides must be alarmed at the navigating bridge and at the maneuvering platform or ECC, as applicable, and must be guarded against inadvertent operation.

(3) Remote propulsion control systems must be failsafe by maintaining the preset (as is) speed and direction of thrust until local manual or alternate manual control is in operation, or the manual safety trip control operates. Failure must activate alarms on the navigating bridge and in the machinery spaces.

[CGD 81–030, 53 FR 17838, May 18, 1988; 53 FR 19090, May 26, 1988; as amended by USCG–2003–16630, 73 FR 65189, Oct. 31, 2008; USCG–2011–0618, 76 FR 60754, Sept. 30, 2011]

§ 62.35–10 Flooding safety.

(a) Automatic bilge pumps must—

(1) Be provided with bilge high level alarms that annunciate in the machinery spaces and at a manned control location and are independent of the pump controls;

(2) Be monitored to detect excessive operation in a specified time period; and

(3) Meet all applicable pollution control requirements.

(b) Remote controls for flooding safety equipment must remain functional under flooding conditions to the extent

required for the associated equipment by § 56.50–50 and § 56.50–95 of this chapter.

(c) Remote bilge level sensors, where provided, must be located to detect flooding at an early stage and to provide redundant coverage.

§ 62.35–15 Fire safety.

(a) All required fire pump remote control locations must include the controls necessary to charge the firemain and—

(1) A firemain pressure indicator; or

(2) A firemain low pressure alarm.

§ 62.35–20 Oil-fired main boilers.

(a) *General.* (1) All main boilers, regardless of intended mode of operation, must be provided with the automatic safety trip control system(s) of paragraphs (h)(1), (h)(2)(i), (h)(2)(ii), and (i) of this section to prevent unsafe conditions after light off.

(2) Manual alternate control of boilers must be located at the boiler front.

(3) A fully automatic main boiler must include—

(i) Automatic combustion control;

(ii) Programing control;

(iii) Automatic feedwater control;

(iv) Safety controls; and

(v) An alarm system.

(4) Following system line-up and starting of auxiliaries, fully automatic main boilers must only require the operator to initiate the following sequences:

(i) Boiler pre-purge.

(ii) Trial for ignition of burners subsequent to successful initial burner light-off.

(iii) Normal shutdown.

(iv) Manual safety trip control operation.

(v) Adjustment of primary control setpoints.

(5) All requirements for programing control subsystems and safety control systems must be met when a boiler—

(i) Automatically sequences burners;

(ii) Is operated from a location remote from the boiler front; or

(iii) Is fully automatic.

(6) Where light oil pilots are used, the programing control and burner safety trip controls must be provided for the light oil system. Trial for ignition must not exceed 15 seconds and the

main burner trial for ignition must not proceed until the pilot flame is proven.

(b) *Feedwater control.* Automatic feedwater control subsystems must sense, at a minimum, boiler water level and steam flow.

(c) *Combustion control.* Automatic combustion control subsystems must provide—

(1) An air/fuel ratio which ensures complete combustion and stable flame with the fuel in use, under light off, steady state, and transient conditions; and

(2) Stable boiler steam pressure and outlet temperatures under steady state and transient load conditions; and

(3) A low fire interlock to prevent high firing rates and superheater damage during boiler warm up.

(d) *Programming control.* The programming control must provide a programmed sequence of interlocks for the safe ignition and normal shutdown of the boiler burners. The programming control must prevent ignition if unsafe conditions exist and must include the following minimum sequence of events and interlocks:

(1) *Prepurge.* Boilers must undergo a continuous purge of the combustion chamber and convecting spaces to make sure of a minimum of 5 changes of air. The purge must not be less than 15 seconds in duration, and must occur immediately prior to the trial for ignition of the initial burner of a boiler. All registers and dampers must be open and an air flow of at least 25 percent of the full load volumetric air flow must be proven before the purge period commences. The prepurge must be complete before trial for ignition of the initial burner.

NOTE: A pre-purge is not required immediately after a complete post-purge.

(2) *Trial for ignition and ignition.* (i) Only one burner per boiler is to be in trial for ignition at any time.

(ii) Total boiler air flow during light off must be sufficient to prevent pocketing and explosive accumulations of combustible gases.

(iii) The burner igniter must be in position and proven energized before admission of fuel to the boiler. The igniter must remain energized until the burner flame is established and stable,

or until the trial for ignition period ends.

(iv) The trial for ignition period must be as short as practical for the specific installation, but must not exceed 15 seconds.

(v) Failure of the burner to ignite during a trial for ignition must automatically actuate the burner safety trip controls.

(3) *Post-purge.* (i) Immediately after normal shutdown of the boiler, an automatic purge of the boiler equal to the volume and duration of the prepurge must occur.

(ii) Following boiler safety trip control operation, the air flow to the boiler must not automatically increase. Post purge in such cases must be under manual control.

(e) *Burner fuel oil valves.* Each burner must be provided with a valve that is—

(1) Automatically closed by the burner or boiler safety trip control system; and

(2) Operated by the programming control or combustion control subsystems, as applicable.

(f) *Master fuel oil valves.* Each boiler must be provided with a master fuel oil valve to stop fuel to the boiler automatically upon actuation by the boiler safety trip control system.

(g) *Valve closure time.* The valves described in paragraphs (e) and (f) of this section must close within 4 seconds of automatic detection of unsafe trip conditions.

(h) *Burner safety trip control system.*

(1) Each burner must be provided with at least one flame detector.

(2) The burner valve must automatically close when—

(i) Loss of burner flame occurs;

(ii) Actuated by the boiler safety trip control system;

(iii) The burner is not properly seated or in place; or

(iv) Trial for ignition fails, if a programming control is provided.

(i) *Boiler safety trip control system.* (1) Each boiler must be provided with a safety trip control system that automatically closes the master and all burner fuel oil valves upon—

(i) Boiler low-low water level;

(ii) Inadequate boiler air flow to support complete combustion;

(iii) Loss of boiler control power;

- (iv) Manual safety trip operation; or
(v) Loss of flame at all burners.

(2) The low-low water level safety trip control must account for normal vessel motions and operating transients.

[CGD 81–030, 53 FR 17838, May 18, 1988, as amended by USCG–2002–13058, 67 FR 61278, Sept. 30, 2002]

§ 62.35–35 Starting systems for internal-combustion engines.

The starting systems for propulsion engines and for prime movers of ships' service generators required to start automatically must meet sections 4–6–5/9.5 and 4–8–2/11.11 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1).

[USCG–2003–16630, 73 FR 65189, Oct. 31, 2008]

§ 62.35–40 Fuel systems.

(a) *Level alarms.* Where high or low fuel tank level alarms are required, they must be located to allow the operator adequate time to prevent an unsafe condition.

(b) *Coal fuels.* (1) Controls and instrumentation for coal systems require spe-

cial consideration by the Commandant CG–521.

(2) Interlocks must be provided to ensure a safe transfer of machinery operation from one fuel to another.

(c) *Automatic fuel heating.* Automatic fuel heating must meet section 4–9–3/15.1 of the ABS Steel Vessel Rules (incorporated by reference; see 46 CFR 62.05–1).

(d) *Overflow prevention.* Fuel oil day tanks, settlers, and similar fuel oil service tanks that are filled automatically or by remote control must be provided with a high level alarm that annunciates in the machinery spaces and either an automatic safety trip control or an overflow arrangement.

[CGD 81–030, 53 FR 17838, May 18, 1988, as amended by CGD 95–072, 60 FR 50463, Sept. 29, 1995; CGD 96–041, 61 FR 50728, Sept. 27, 1996; USCG–2003–16630, 73 FR 65190, Oct. 31, 2008; USCG–2009–0702, 74 FR 49229, Sept. 25, 2009]

§ 62.35–50 Tabulated monitoring and safety control requirements for specific systems.

The minimum instrumentation, alarms, and safety controls required for specific types of systems are listed in Table 62.35–50.

TABLE 62.35–50—MINIMUM SYSTEM MONITORING AND SAFETY CONTROL REQUIREMENTS FOR SPECIFIC SYSTEMS (NOTE 1)

System	Service	Instrumentation	Alarm	Safety control	Notes
Main (Propulsion) boiler	(1)	(1)	(1) .....	.....	(2)
	Supply casing and uptakes .....	.....	Fire .....	.....
	Burner flame	Status	Failure	Burner auto trip	(3)
	Burner seating .....	.....	Failure .....	.....ditto	(3)
	Trial for ignition	Status	Failure .....	.....ditto	
	Control power	Available (pressure)	Failure (low) .....	.....ditto	(3)
	.....	.....	.....	Manual trip	(3)
	Burner valve	Open/closed .....	.....	.....
Main (Propulsion steam) turbine.	Low fire interlock	Status .....	.....	.....
	Program control interlock	Status .....	.....	.....
Main (Propulsion) diesel	(2)	(2)	(2) .....	.....	(4, 5)
Main propulsion, remote control.	(1)	(1)	(1)	Manual trip	(4, 5)
	.....	.....	Failure .....	.....ditto	
Main propulsion, electric	Auto safety trip override .....	.....	Activated .....	.....
	Starting power	Pressure (voltage)	Low	Limit	(2)
	Location in control	Status	Override .....	.....	(6)
	Shaft speed/direction/pitch	(3)	(3)	(3)	
	Clutch fluid	Pressure	Low .....	.....
	(4)	(4)	(4)	(4)	(7)
Main propulsion, shafting.	Stern tube oil tank level .....	.....	Low .....	.....
	Line shaft bearing	Temperature	High .....	.....